National Renewable Energy Laboratory
Innovation for Our Energy Future

OpenEI | OPENENERGYINFO (OpenEI.org)

NREL/PIX 17613

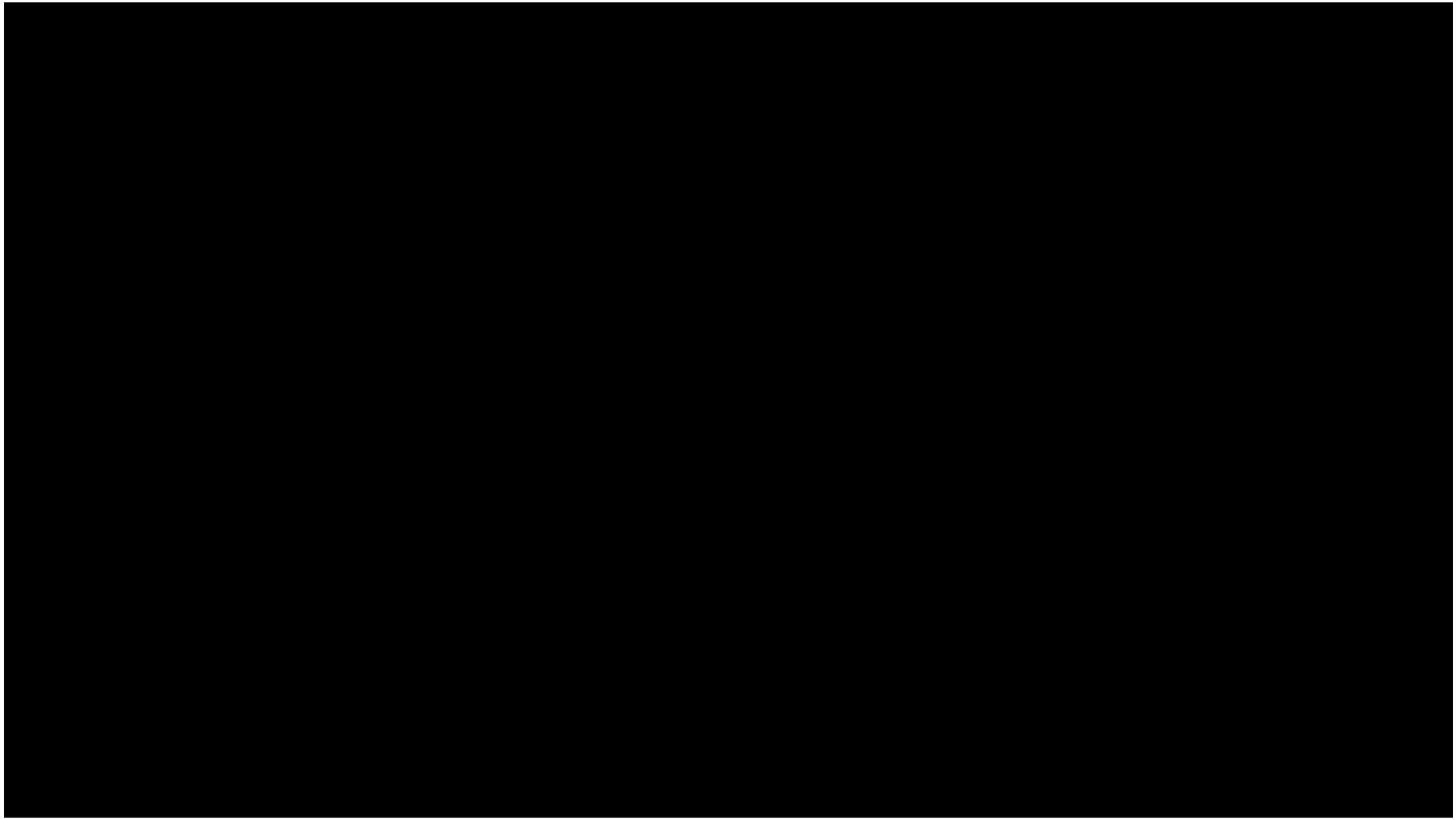
Open Energy Information - Facilitating access, use, and contribution of worldwide energy data and information

Debbie Brodt-Giles
IMC
April 2012

Overview

- Opportunity for shared energy information
- Strategic direction
- Alignment with the White House Open Government Initiative
- Collaborative approach
- Linked open data standards
- DOE Programs and Apps on OpenEI
- OpenEI data in action

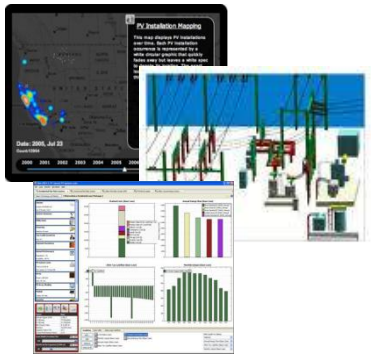
Video



How can we share and leverage the world's vast energy digital assets to make better decisions?

The Collaboration Challenge

SILO Data



SILO Tools & Models

SILO Knowledge

Digital Tsunami Emerging

Integrated Tools & Models

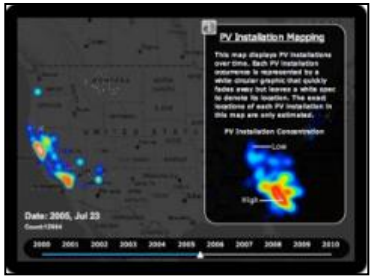
Collective Intelligence

We tend to gravitate to familiar SILOS.

What type of data are we talking about?

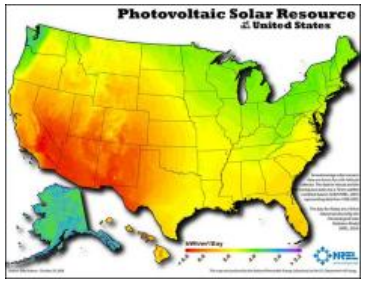
Energy Data

Energy Tools



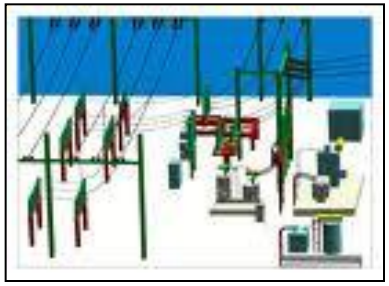
Energy Docs

Energy Maps



Education

Energy Models



Published collective intelligence of the community

OpenEI Strategy

Catalyze the collection of the world's energy information to advance the adoption of renewable energy, fuel innovation and better inform energy decisions of policy makers, researchers, investors, and consumers

Linked Open Data for Improved access to energy-related information

Easy, legal, & scalable data sharing and ratings

Community support for contributions and collaboration

Assessments of information quality & provenance

Services for application development & derived data knowledge

Crowdsourced Dataset Generation

Open Government Initiative

Government should be transparent.

Transparency promotes accountability and provides information for citizens about what their Government is doing. **Information maintained by the Federal Government is a national asset.** My Administration will take appropriate action, consistent with law and policy, to **disclose information rapidly in forms that the public can readily find and use**. Executive departments and agencies should harness new technologies to **put information about their operations and decisions online and readily available to the public**. Executive departments and agencies should also **solicit public feedback to identify information of greatest use** to the public.

Government should be participatory.

Public engagement enhances the Government's effectiveness and improves the quality of its decisions. **Knowledge is widely dispersed in society**, and public officials benefit from having access to that dispersed knowledge. Executive departments and agencies should **offer Americans increased opportunities to participate** in policymaking and to provide their Government with the **benefits of their collective expertise and information**. Executive departments and agencies should also **solicit public input** on how we can increase and improve opportunities for public participation in Government.

Government should be collaborative.

Collaboration actively **engages Americans in the work** of their Government. Executive departments and agencies should **use innovative tools, methods, and systems to cooperate among themselves**, across all levels of Government, and with nonprofit organizations, businesses, and individuals in the private sector. Executive departments and agencies should **solicit public feedback to assess and improve their level of collaboration** and to **identify new opportunities for cooperation.**

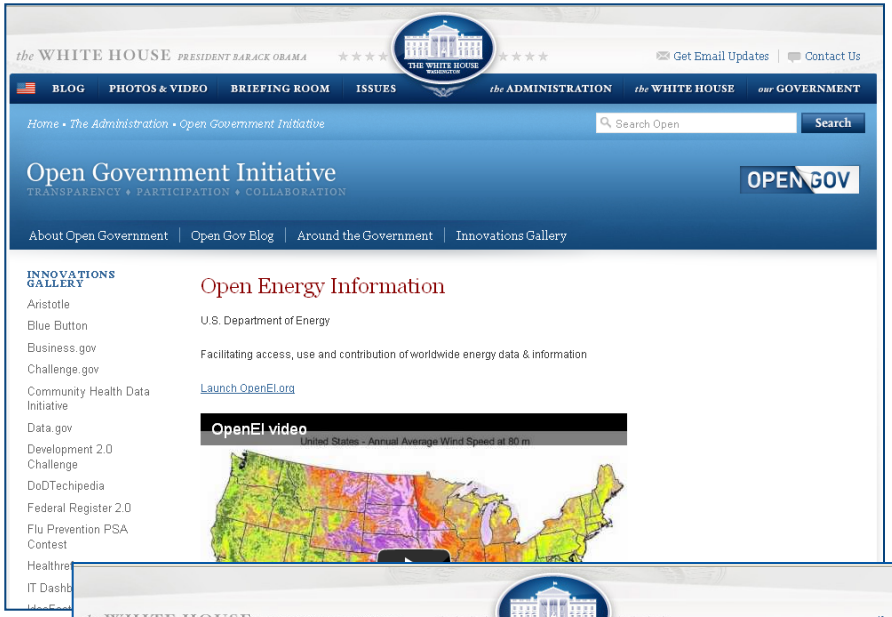
Source: White House Memorandum on Transparency and Open Government, January 29, 2009

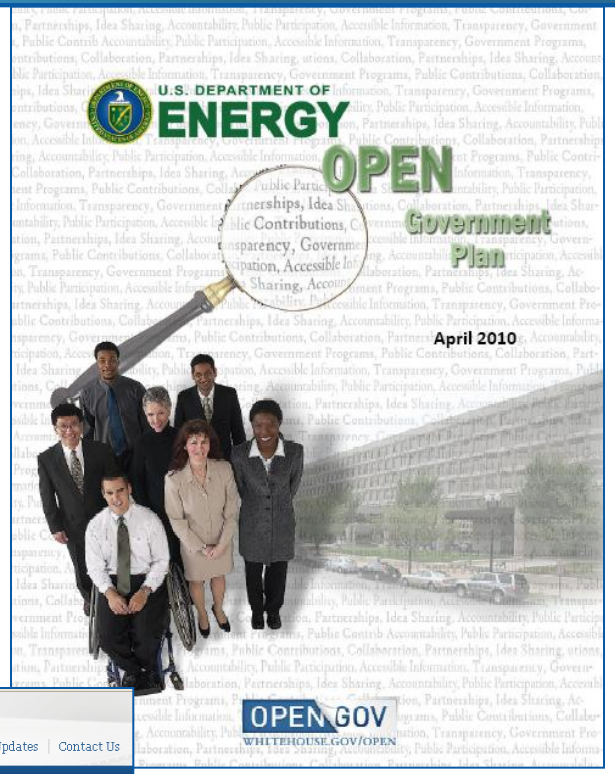
Open Government Initiative

DOE issued **press release** to launch OpenEI as its Open Government Initiative (12/09)

Featured on **White House Innovations Gallery** (1/11)

Recognized by the White House as a **Flagship Open Government Initiative** (4/10)





DOE releases **Open Government Plan**, which highlights OpenEI (4/10)

Notable Quotes

"This information platform will allow people across the globe to benefit from the Department of Energy's clean energy data and technical resources. The true potential of this tool will grow with the public's participation – as they add new data and share their expertise – to ensure that all communities have access to the information they need to broadly deploy the clean energy resources of the future."

Dr. Steven Chu, Secretary of Energy
http://energy.gov/news2009/8381.htm

"Wow ... Energy linked data portal"

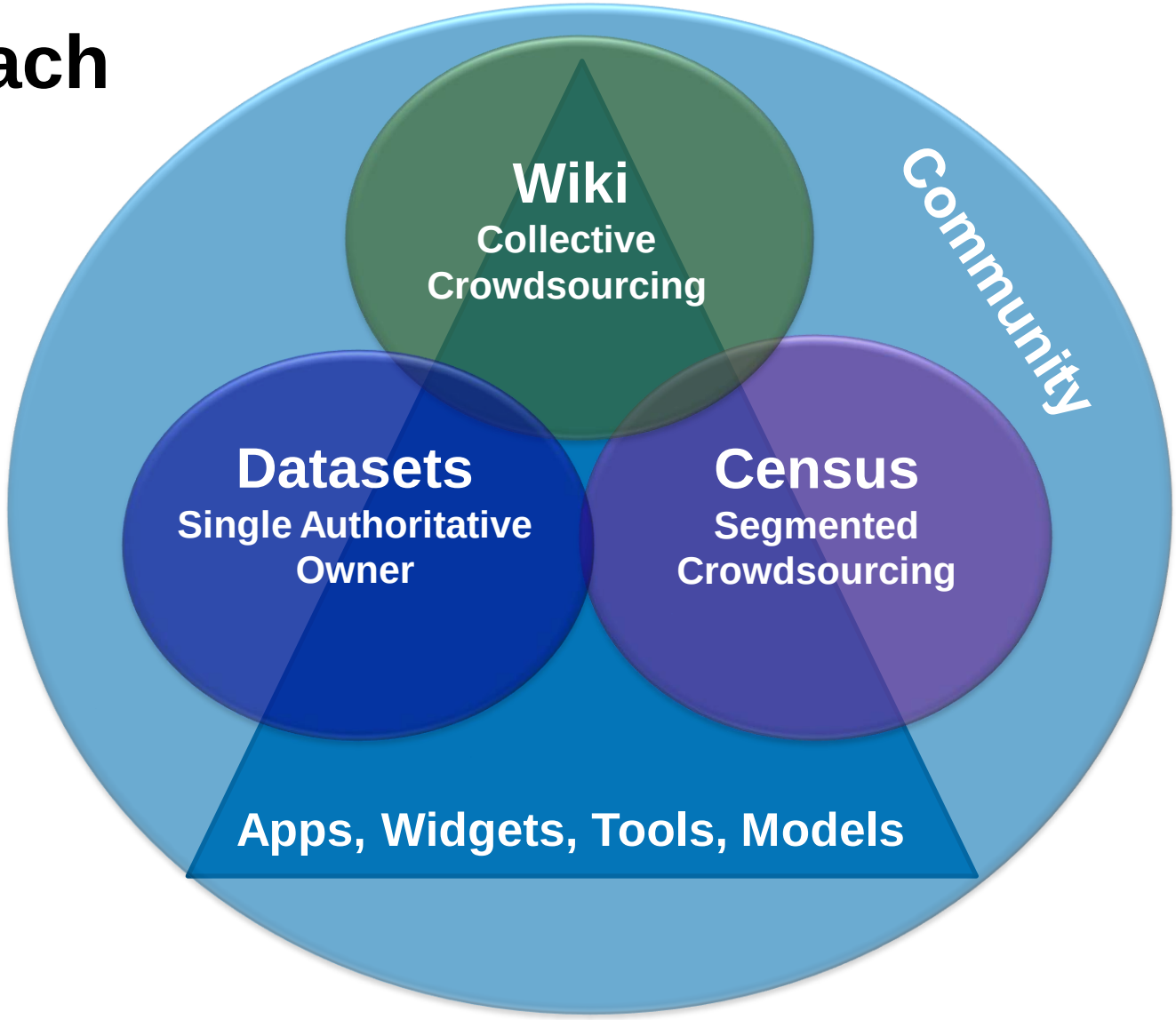
Tim Berners-Lee, Inventor of the World Wide Web
http://twitter.com/timberners_lee/status/7062198463

"Love that DOE is doing OpenEI.org"

Tim O'Reilly, Web 2.0 Pioneer and Founder of O'Reilly Media
http://twitter.com/timoreilly/status/11792155576

	Collective *"The Wiki Way"*	Segmented *"The Census Model"*	Authoritative *"Single Owner"*
Create	World	Varies	World
Read	World	Varies	World
Update	World	Owner	Owner
Delete	World	Owner	Owner
Granularity	Element	Element	Item
Examples			

Collaboration Approach

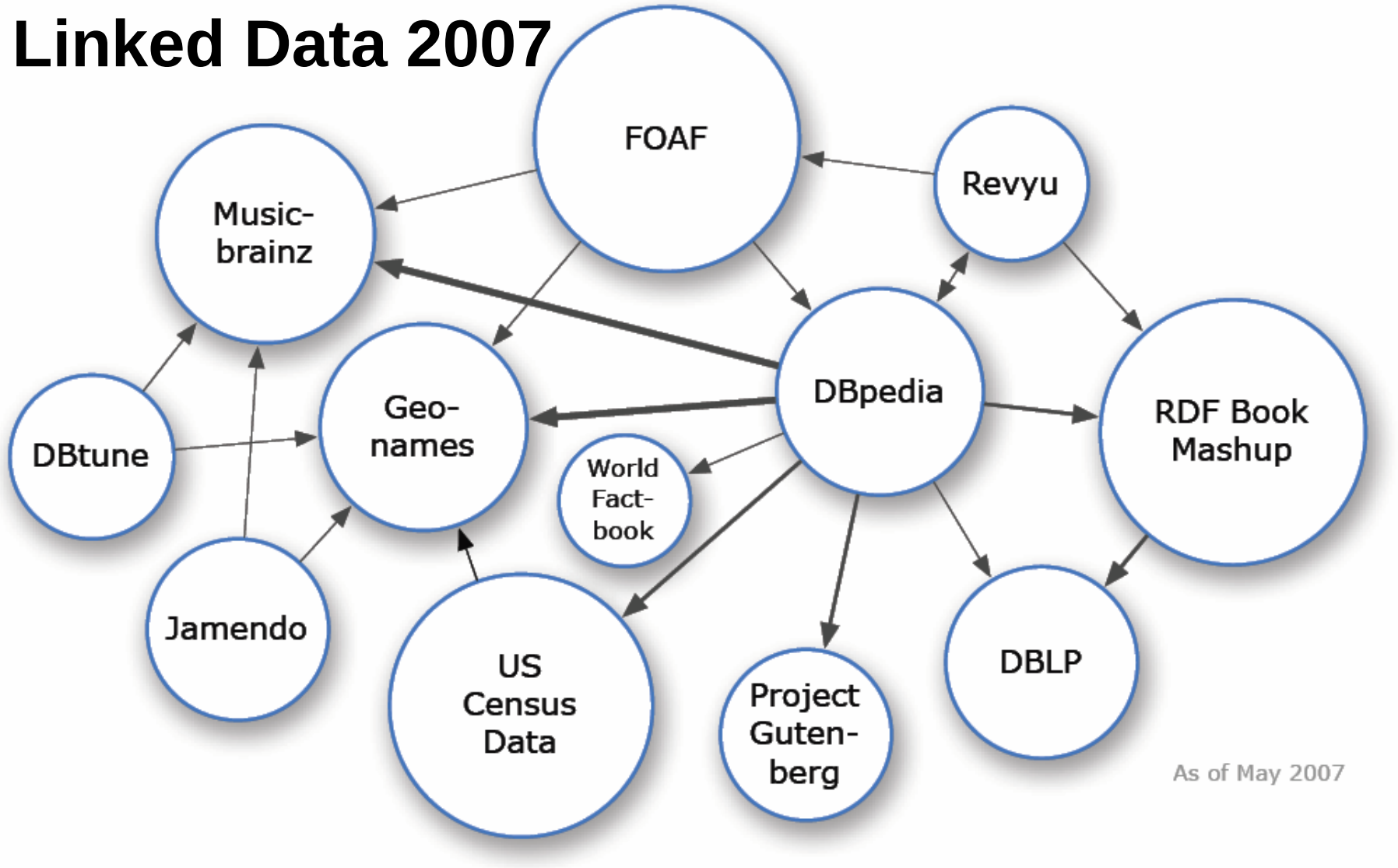


What is Linked Open Data?

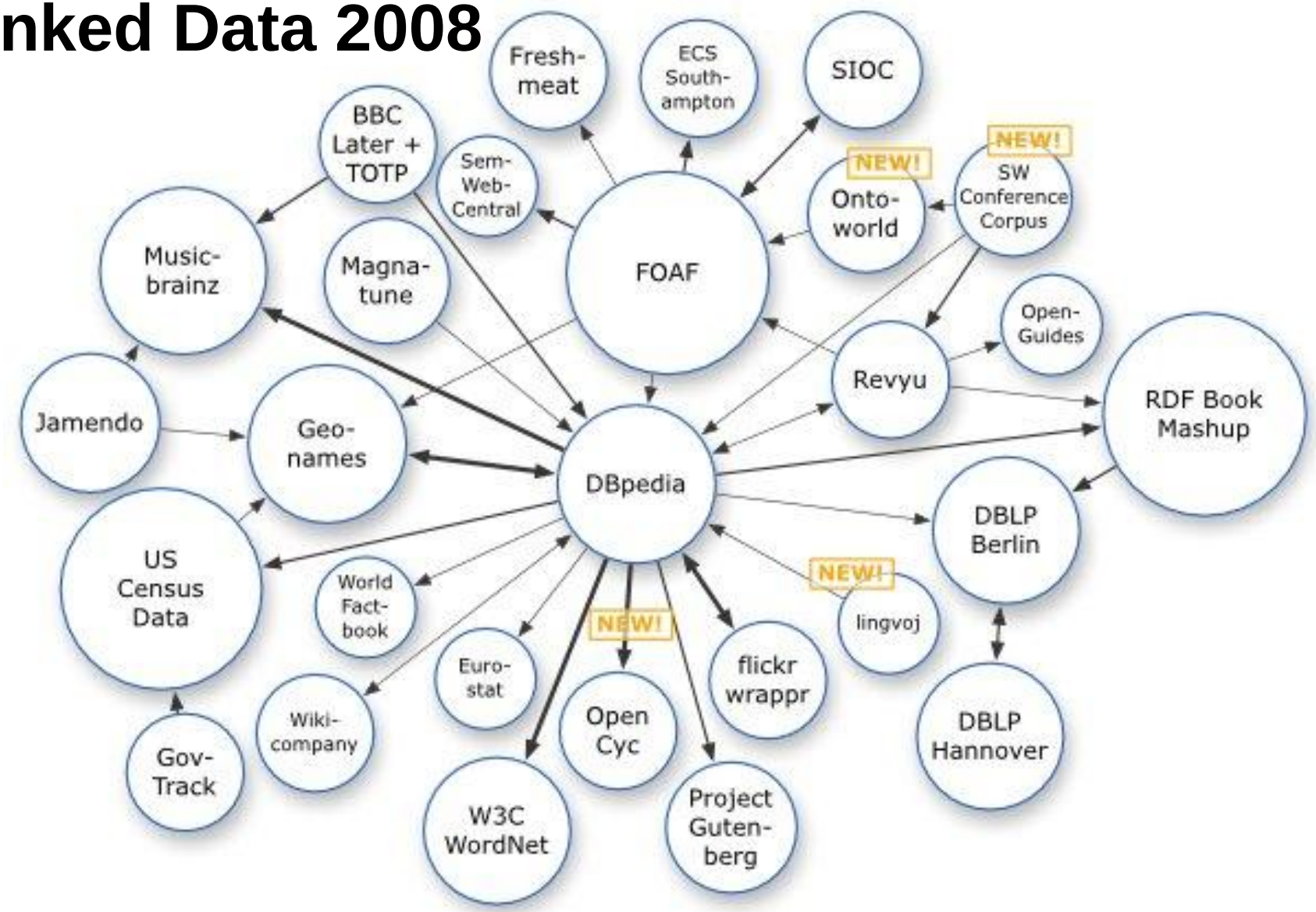
Typical Websites Without Linked Open Data

With Linked Open Data

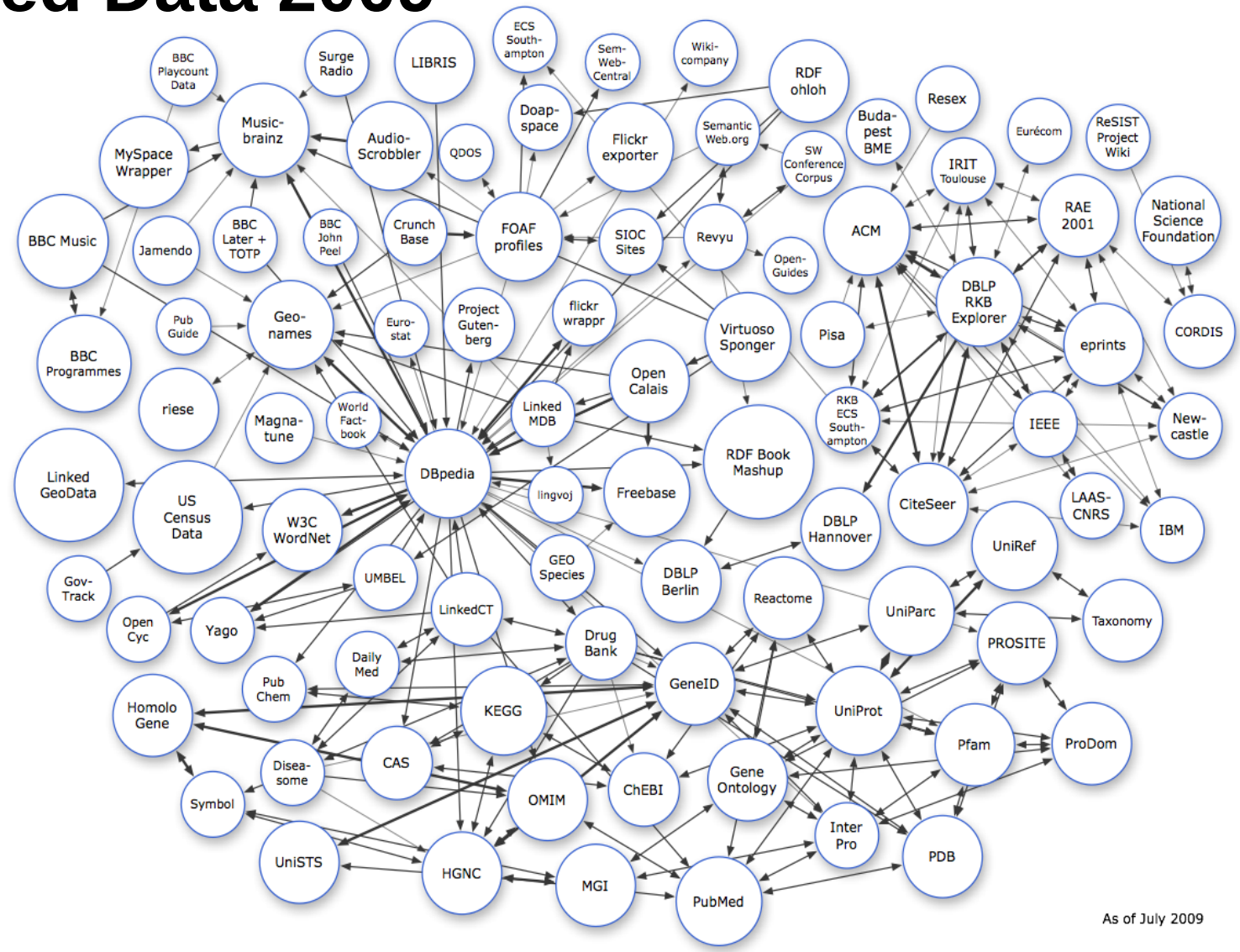
Linked Data 2007



Linked Data 2008

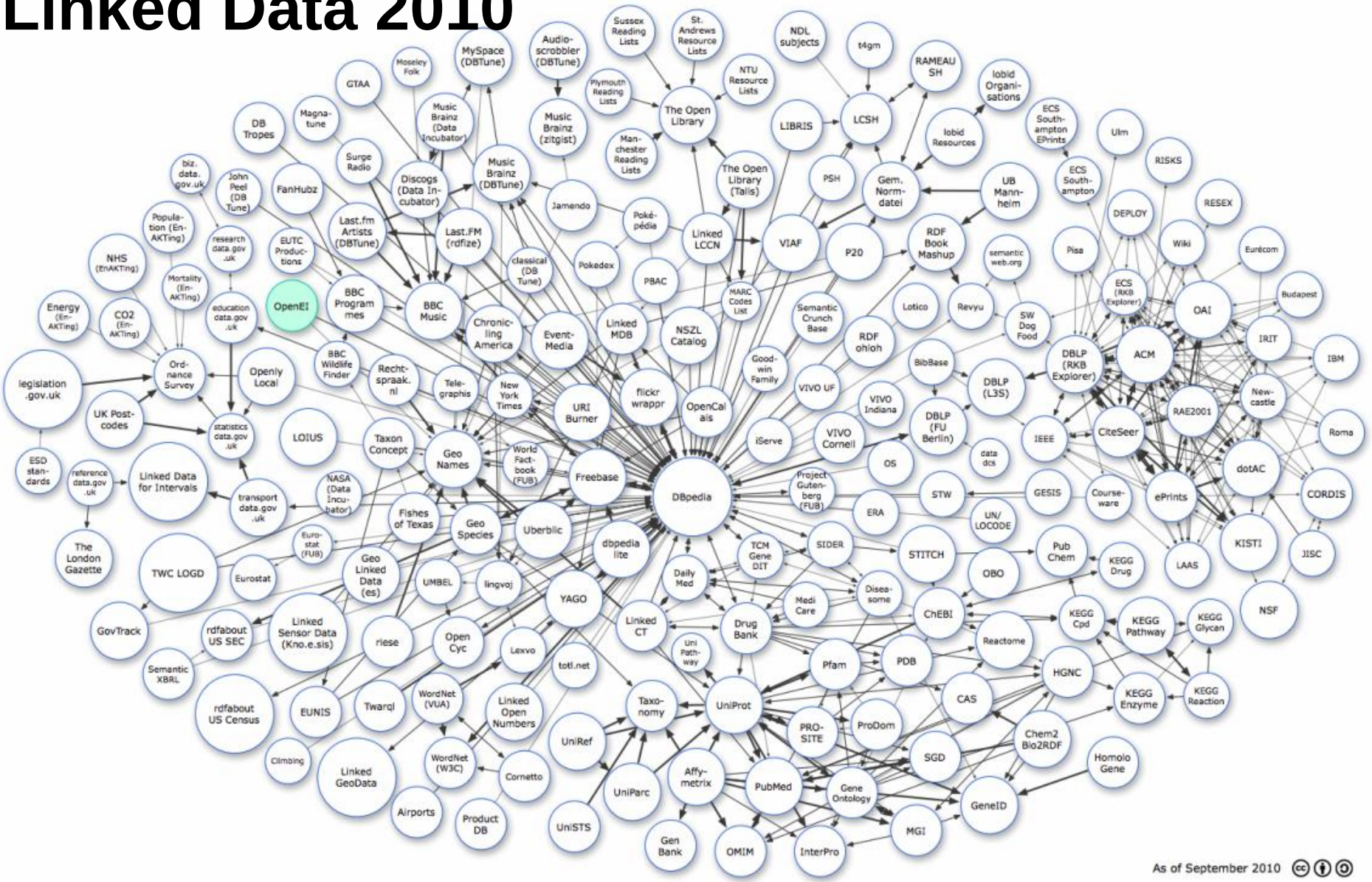


Linked Data 2009



As of July 2009

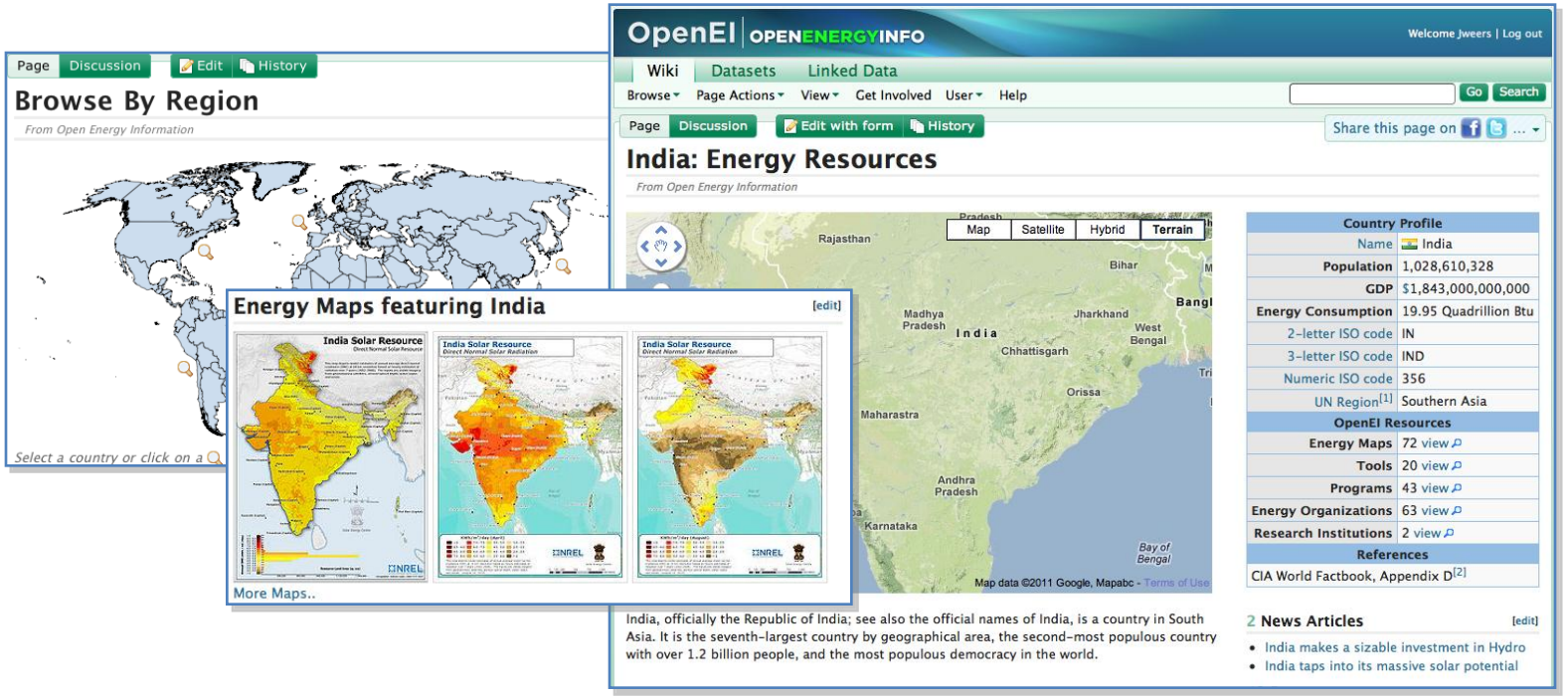
Linked Data 2010



Linked Open Data on OpenEI

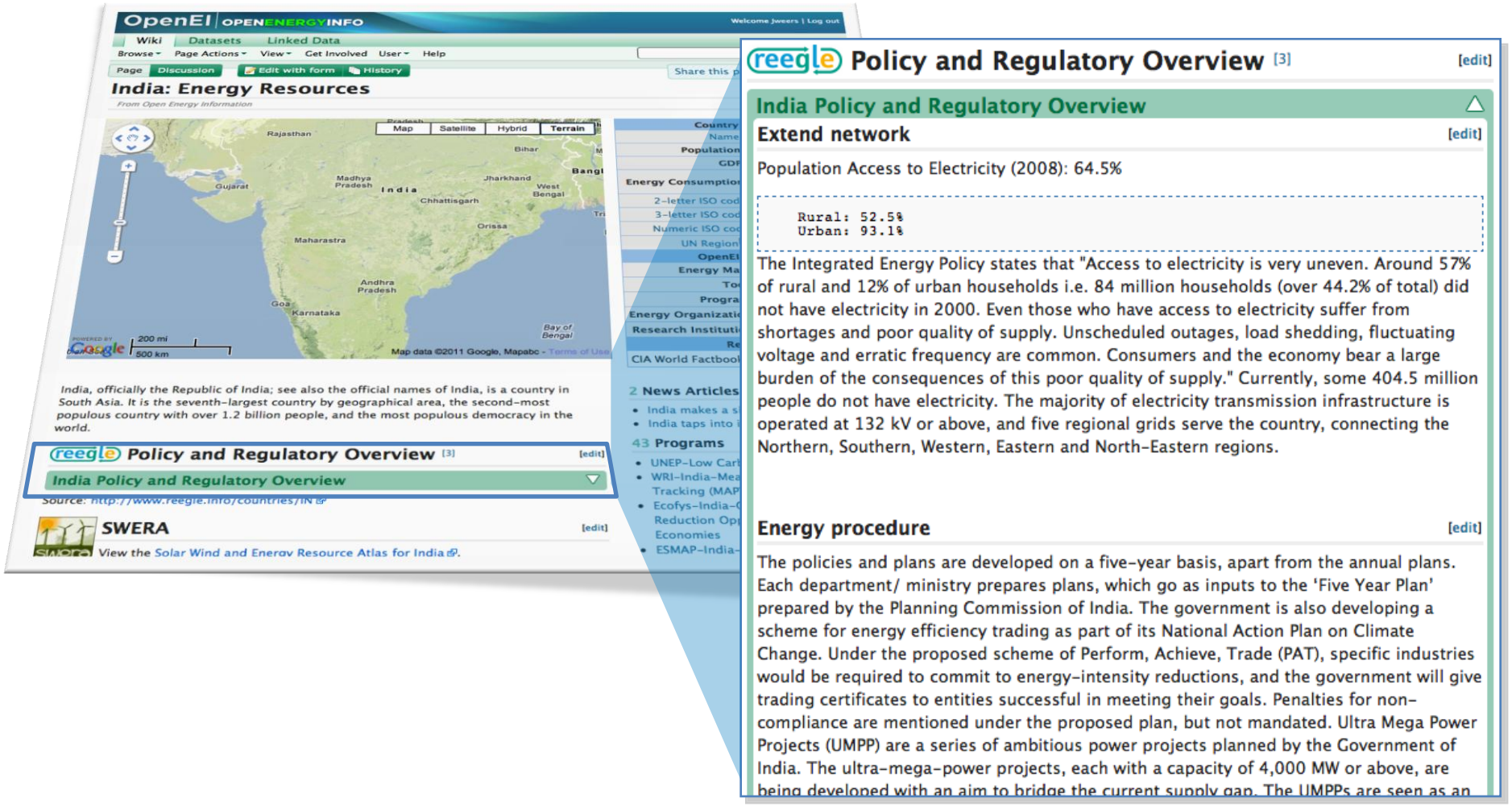
- more than 55,000 content pages
- more than 800 downloadable datasets
- regional gateways on a variety of energy-related topics

Check out our Country Pages to see linked open data in action!

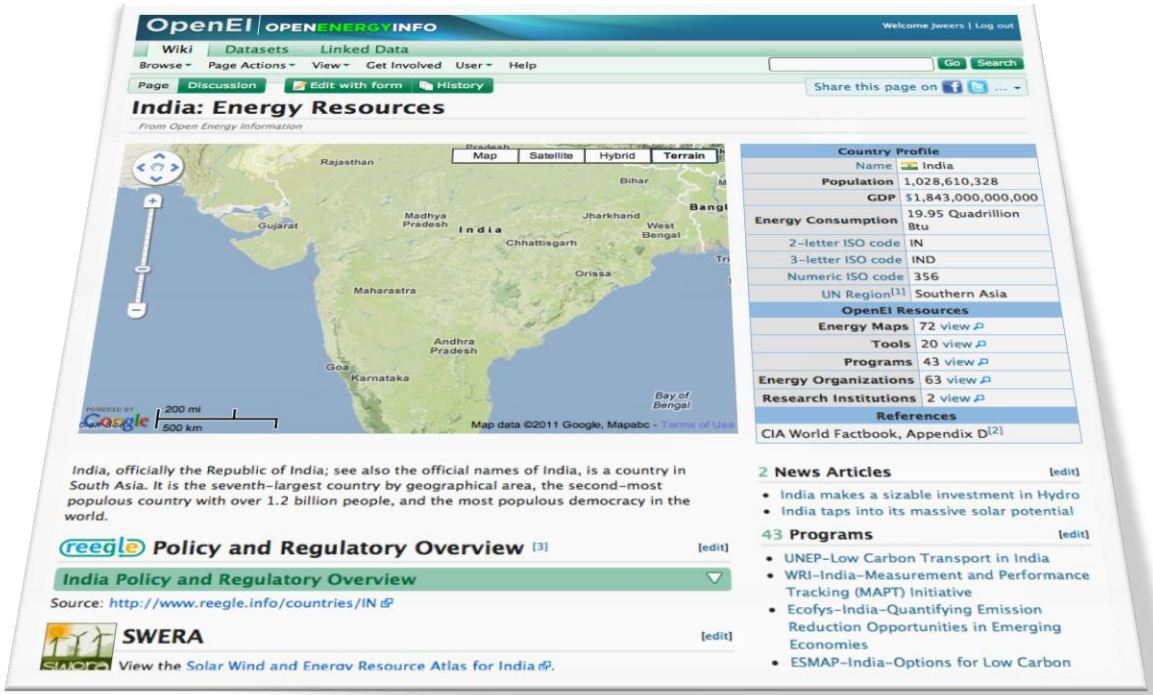


Featured LOD Functionality

Reegle Policy and Regulatory Overview



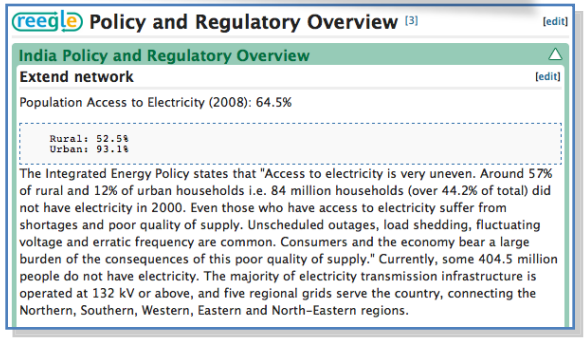
Behind The Scenes, LOD at Work



reegle profiles are consumed in real time using SPARQL

use of semantic concepts allows the correct profile to be pulled

SPARQL

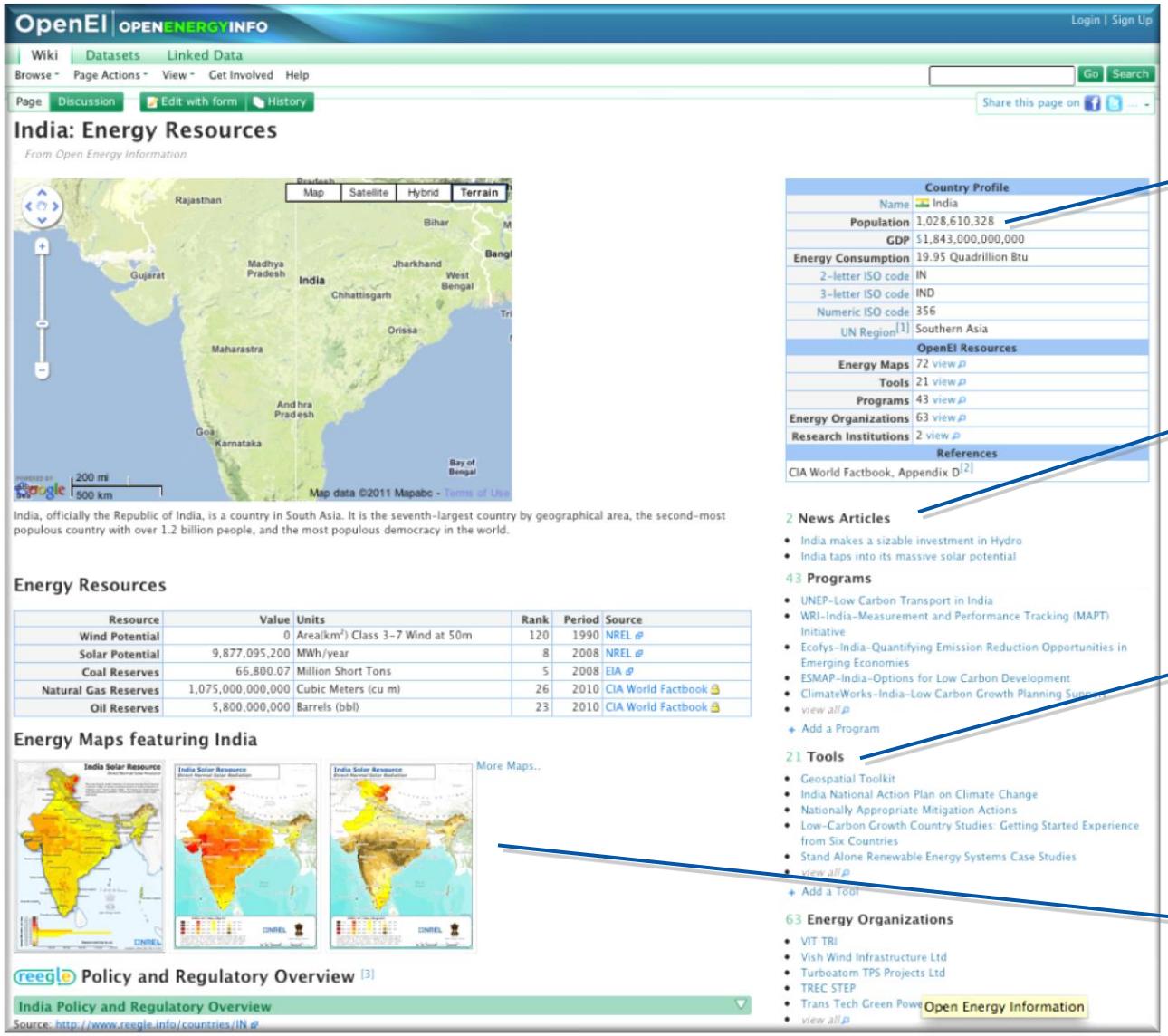


reegle DATA

SPARQL Endpoint

Print page

Contact reegle

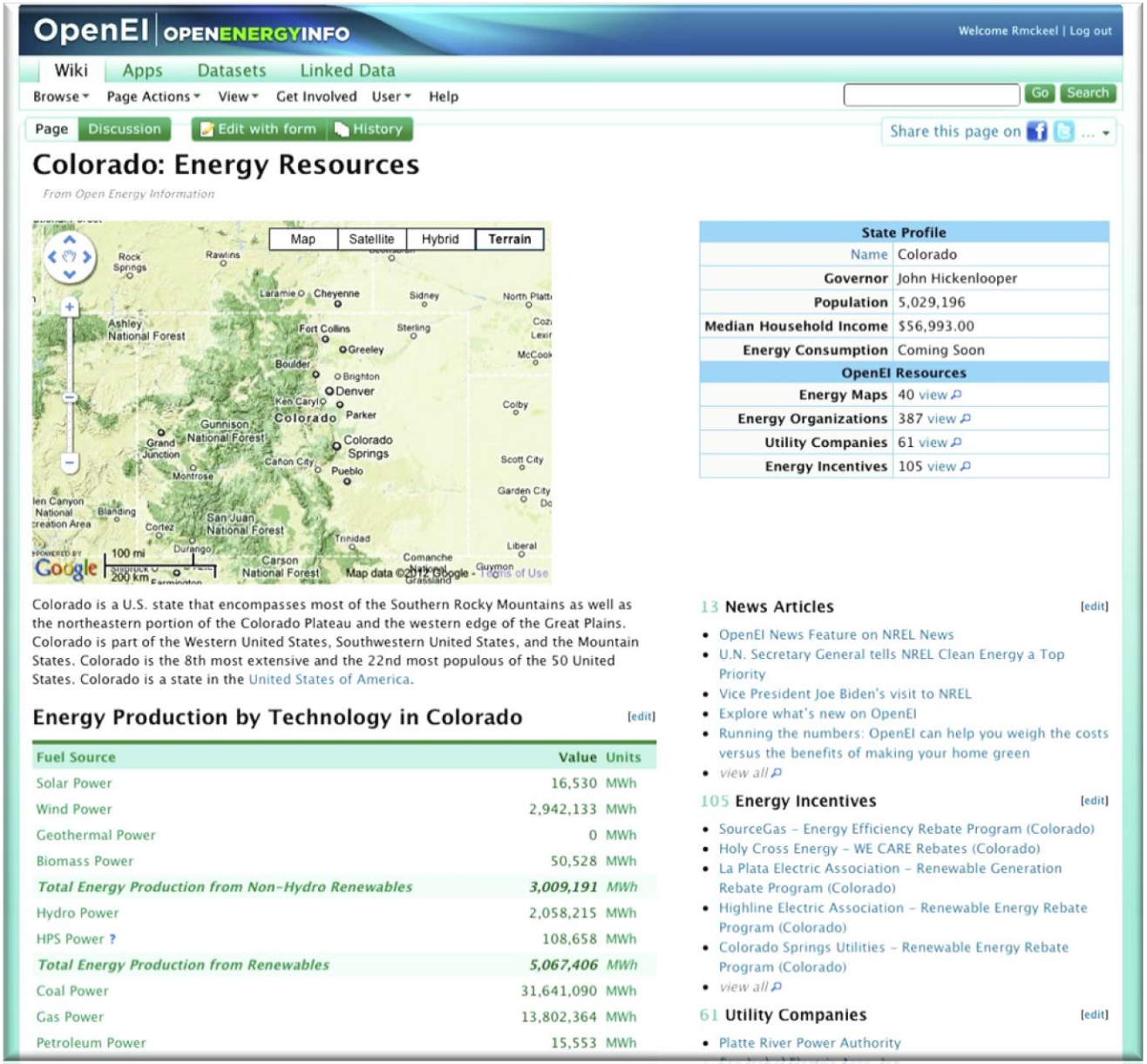


Basic country info; semantically linked to external resources

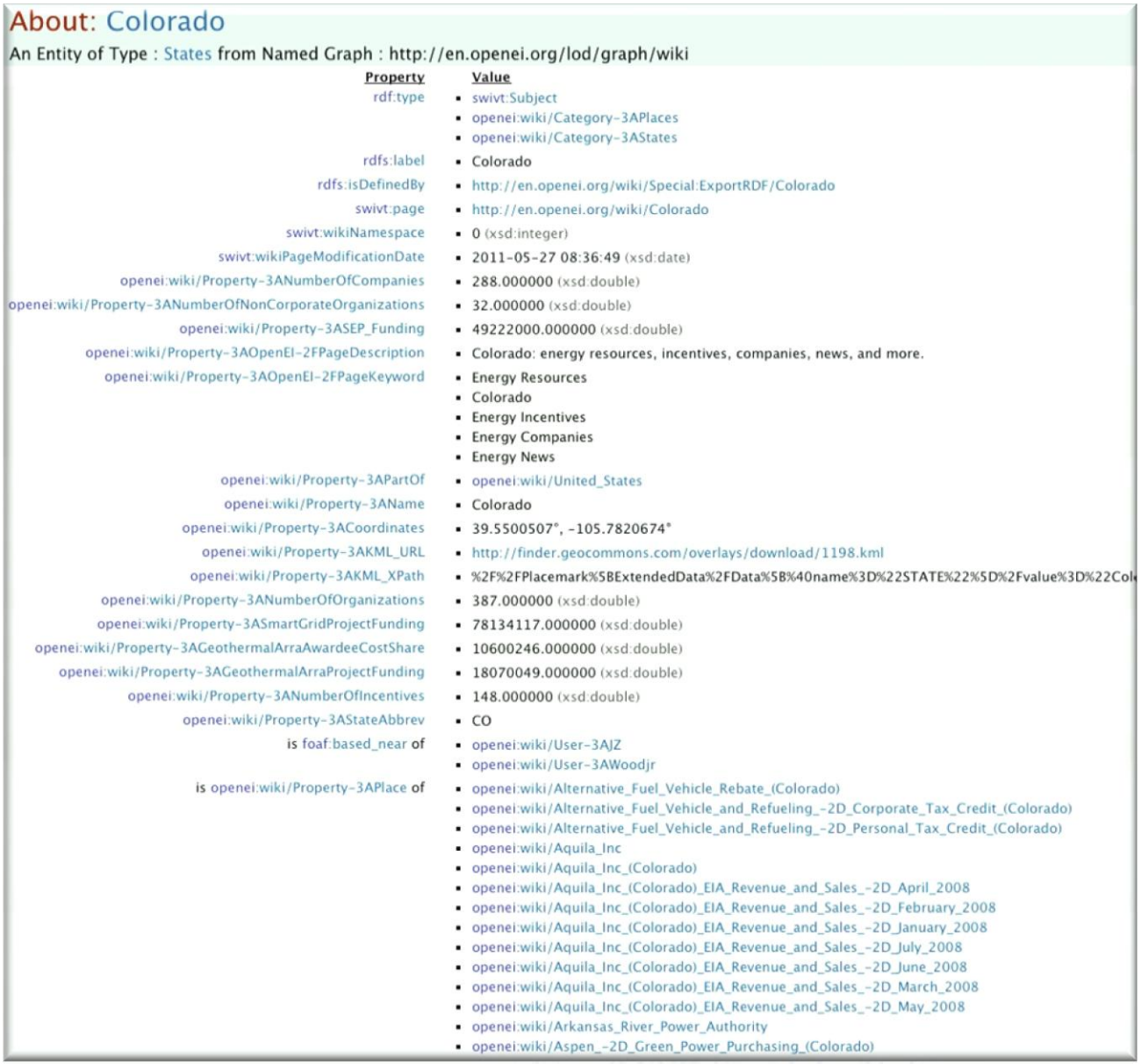
Energy-related news in India

Tools/models/resources relevant to India

Access to dozens of RE resource maps for India



OpenEI's Colorado page for humans



About: Colorado

An Entity of Type : States from Named Graph : http://en.openei.org/lod/graph/wiki

Property	Value
rdf:type	• swivt:Subject • openei:wiki/Category-3APlaces • openei:wiki/Category-3AStates
rdfs:label	• Colorado
rdfs:isDefinedBy	• http://en.openei.org/wiki/Special:ExportRDF/Colorado
swivt:page	• http://en.openei.org/wiki/Colorado
swivt:wikiNamespace	• 0 (xsd:integer)
swivt:wikiPageModificationDate	• 2011-05-27 08:36:49 (xsd:date)
openei:wiki/Property-3ANumberOfCompanies	• 288.000000 (xsd:double)
openei:wiki/Property-3ANumberOfNonCorporateOrganizations	• 32.000000 (xsd:double)
openei:wiki/Property-3ASEP_Funding	• 49222000.000000 (xsd:double)
openei:wiki/Property-3AOpenEI-2FPageDescription	• Colorado: energy resources, incentives, companies, news, and more.
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openei:wiki/Property-3APartOf	• openei:wiki/United_States
openei:wiki/Property-3AName	• Colorado
openei:wiki/Property-3ACoordinates	• 39.5500507°, -105.7820674°
openei:wiki/Property-3AKML_URL	• http://finder.geocommons.com/overlays/download/1198.kml
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is foaf:based_near of	• openei:wiki/User-3AJZ • openei:wiki/User-3AWoodjr
is openei:wiki/Property-3APlace of	• openei:wiki/Alternative_Fuel_Vehicle_Rebate_(Colorado) • openei:wiki/Alternative_Fuel_Vehicle_and_Refueling_-2D_Corporate_Tax_Credit_(Colorado) • openei:wiki/Alternative_Fuel_Vehicle_and_Refueling_-2D_Personal_Tax_Credit_(Colorado) • openei:wiki/Aquila_Inc • openei:wiki/Aquila_Inc_(Colorado) • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_April_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_February_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_January_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_July_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_June_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_March_2008 • openei:wiki/Aquila_Inc_(Colorado)_EIA_Revenue_and_Sales_-2D_May_2008 • openei:wiki/Arkansas_River_Power_Authority • openei:wiki/Aspen_-2D_Green_Power_Purchasing_(Colorado)

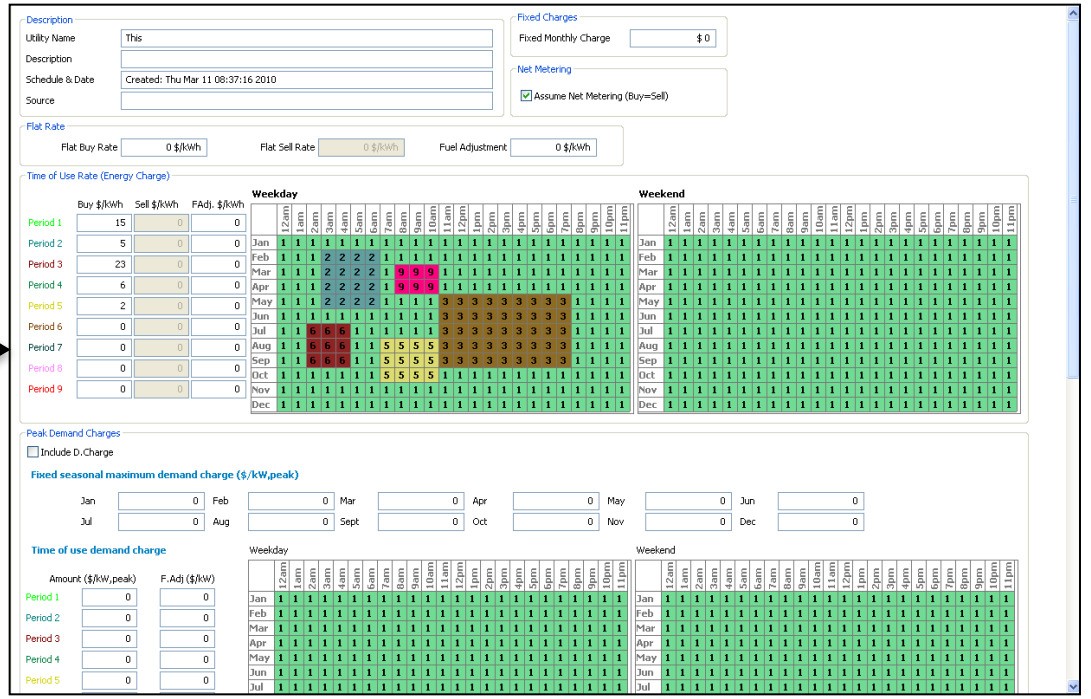
OpenEI's Colorado page for machines

Assembling New Data via "Crowdsourcing"

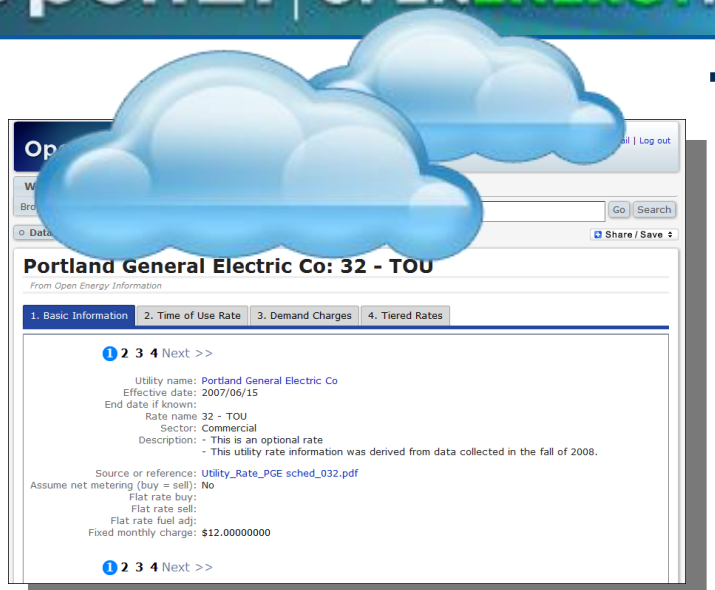
"**Does EIA publish electric utility rate, tariff, and demand charge data?**
No, EIA does not collect or publish data on electricity rates, or tariffs, for the sale or purchase of electricity, or on demand charges for electricity service, nor does EIA publish retail electricity rates or prices for peak or off-peak periods (sometimes referred to as time-of-use-rates)."

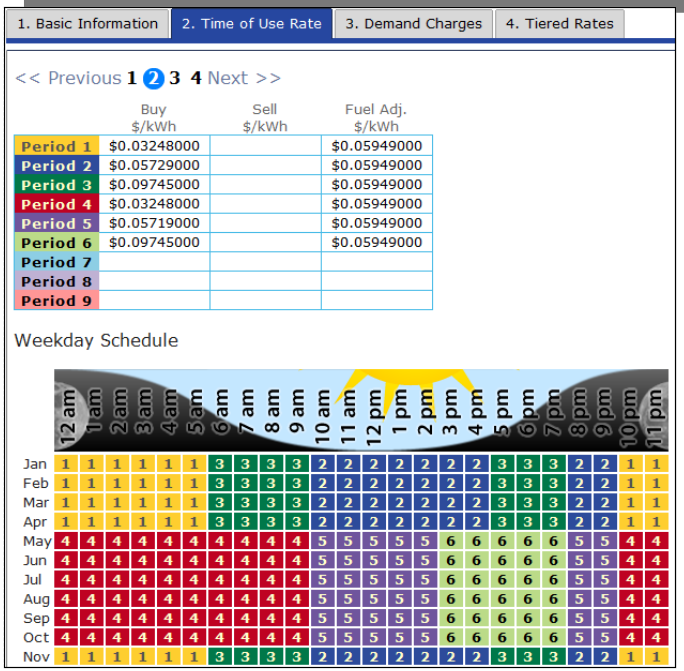
EIA Frequently Asked Questions
http://www.eia.doe.gov/tools/faqs/faq.cfm?id=20&t=3

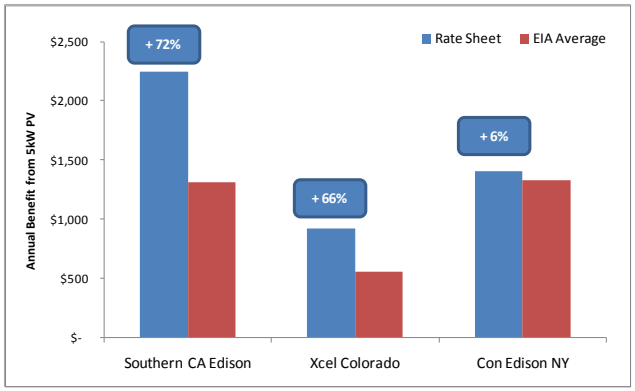
Response: Crowdsourced Data Entry

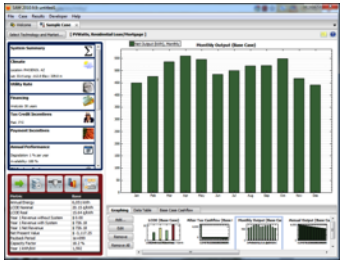


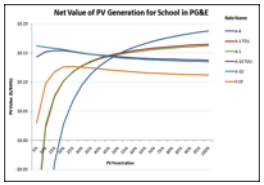
The Utility Rate Database

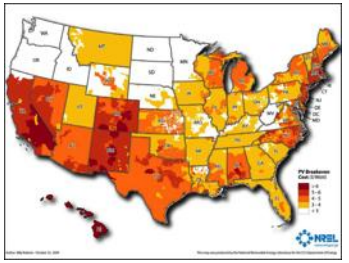


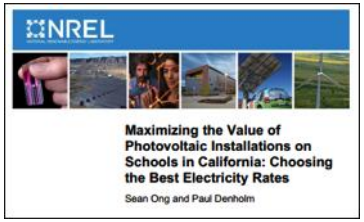




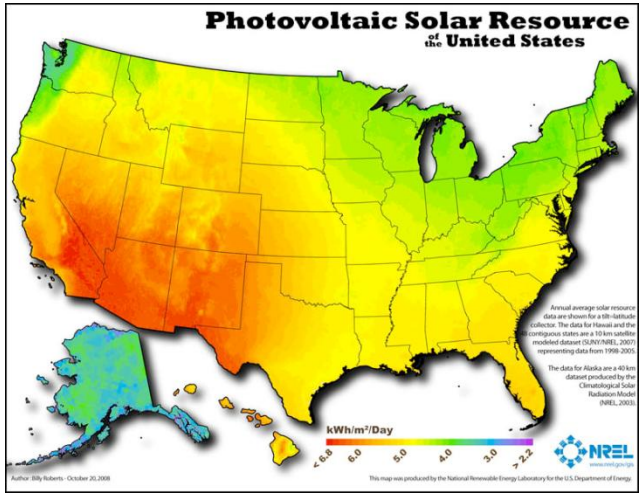








Leveraging and Linking Existing Data



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SUNY_098052465.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052475.csv.gz	571 KB	3/5/07 12:00:00 AM
SUNY_098052485.csv.gz	569 KB	3/5/07 12:00:00 AM
SUNY_098052495.csv.gz	569 KB	3/5/07 12:00:00 AM
SUNY_098052505.csv.gz	568 KB	3/5/07 12:00:00 AM
SUNY_098052515.csv.gz	569 KB	3/5/07 12:00:00 AM
SUNY_098052525.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052535.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052545.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052555.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052565.csv.gz	571 KB	3/5/07 12:00:00 AM
SUNY_098052575.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052585.csv.gz	570 KB	3/5/07 12:00:00 AM
SUNY_098052595.csv.gz	570 KB	3/5/07 12:00:00 AM

Data Upload:

Choose File | No file chosen | Upload
Maximum Filesize: *256 MB*
Allowed Extensions: *txt zip xml csv xls xlsx*

Choose File | No file chosen | Upload
Maximum Filesize: *256 MB*
Allowed Extensions: *txt zip xml csv xls xlsx*

Choose File | No file chosen | Upload
Maximum Filesize: *256 MB*
Allowed Extensions: *txt zip xml csv xls xlsx*

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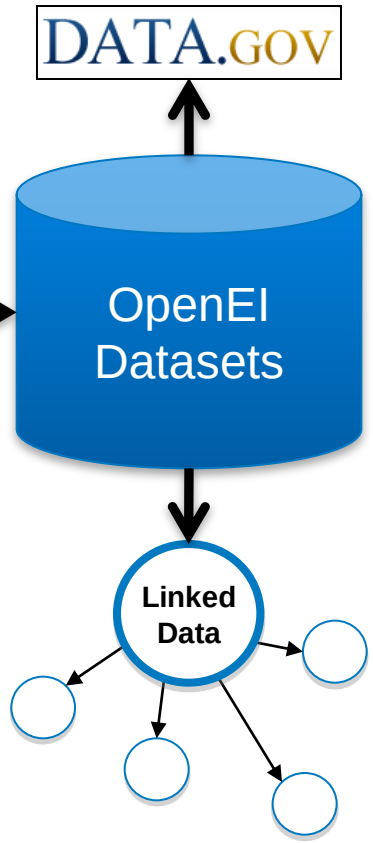
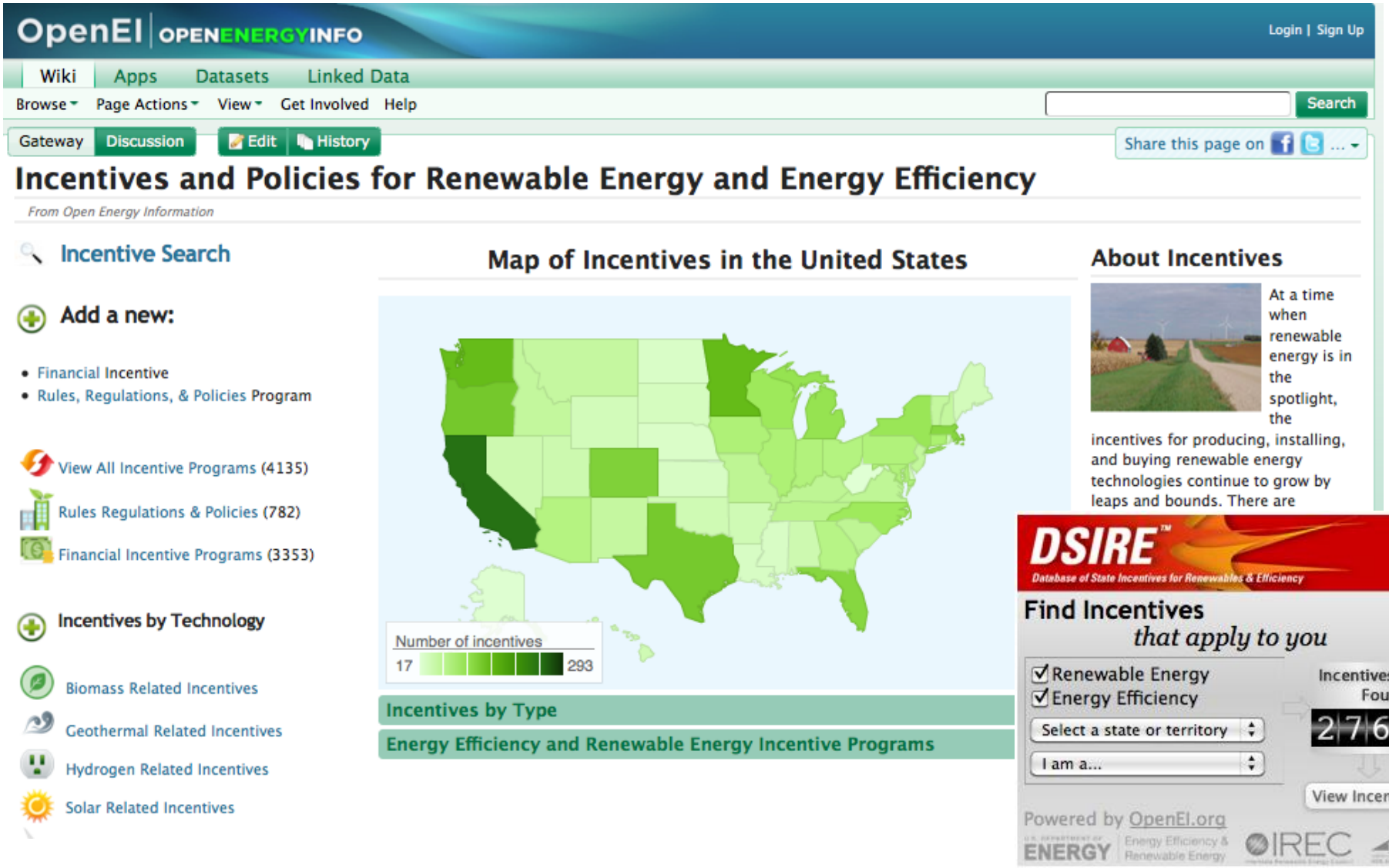


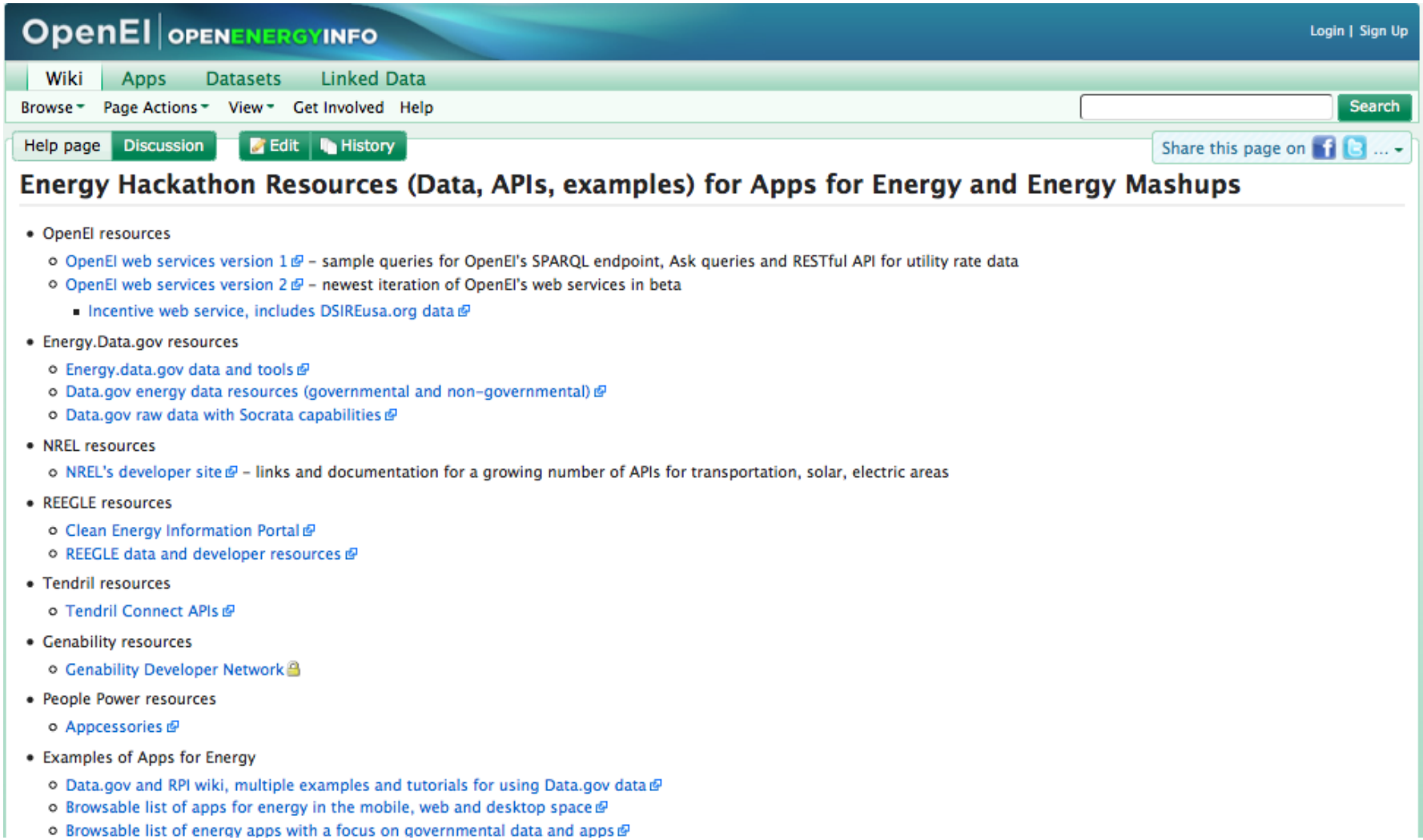
Incentives can be downloaded as used!



More than 120 Energy Apps on OpenEI!

Green Button Apps and Info!

Data, APIs, and Info for Developers



OpenEI | OPENENERGYINFO

Login | Sign Up

Wiki | Apps | Datasets | Linked Data

Browse | Page Actions | View | Get Involved | Help | Search

Help page | Discussion | Edit | History | Share this page on ...

Energy Hackathon Resources (Data, APIs, examples) for Apps for Energy and Energy Mashups

- OpenEI resources
  - OpenEI web services version 1 – sample queries for OpenEI's SPARQL endpoint, Ask queries and RESTful API for utility rate data
  - OpenEI web services version 2 – newest iteration of OpenEI's web services in beta
    - Incentive web service, includes DSIREusa.org data
- Energy.Data.gov resources
  - Energy.data.gov data and tools
  - Data.gov energy data resources (governmental and non-governmental)
  - Data.gov raw data with Socrata capabilities
- NREL resources
  - NREL's developer site – links and documentation for a growing number of APIs for transportation, solar, electric areas
- REEGLE resources
  - Clean Energy Information Portal
  - REEGLE data and developer resources
- Tendril resources
  - Tendril Connect APIs
- Genability resources
  - Genability Developer Network
- People Power resources
  - Appcessories
- Examples of Apps for Energy
  - Data.gov and RPI wiki, multiple examples and tutorials for using Data.gov data
  - Browsable list of apps for energy in the mobile, web and desktop space
  - Browsable list of energy apps with a focus on governmental data and apps

Geothermal Data Repository is on OpenEI

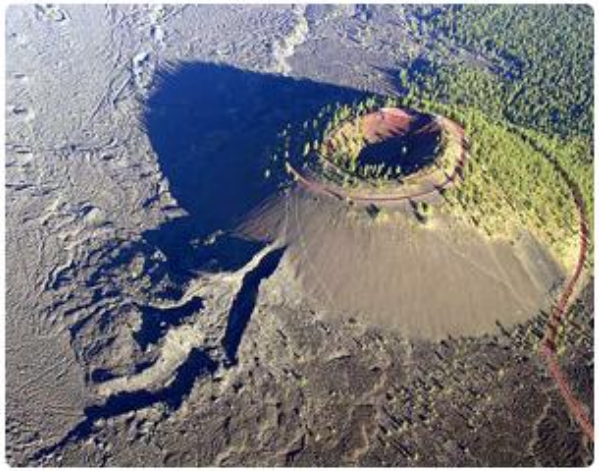
OpenEI | OPENENERGYINFO

Login | Sign Up

Wiki | Apps | Datasets | Linked Data

GDR Home | Browse GDR | Browse All OpenEI Data

Geothermal Data Repository



Submit your geothermal project and site data to the Geothermal Data Repository (GDR) using the link below. The GDR has been established to securely house data based on individual timelines, some of which have identified a specific release date. Please note:

1. All GDR data will eventually be made available to the public.
2. Data not intended for eventual public release should not be uploaded to the GDR.
3. Boise State University is serving as the data curator for the GDR and is also responsible for approving the data release schedules based on previous agreements.

If you have questions regarding this data submission process, please contact the OpenEI webmaster.

Create an OpenEI account or login to submit data

Transparent Cost Database on OpenEI

Contribute Data

Share this page on ...

Transparent Cost Database

Generation

Showing:
Historical | Projections

Report year:
2008 to 2011

Fuels

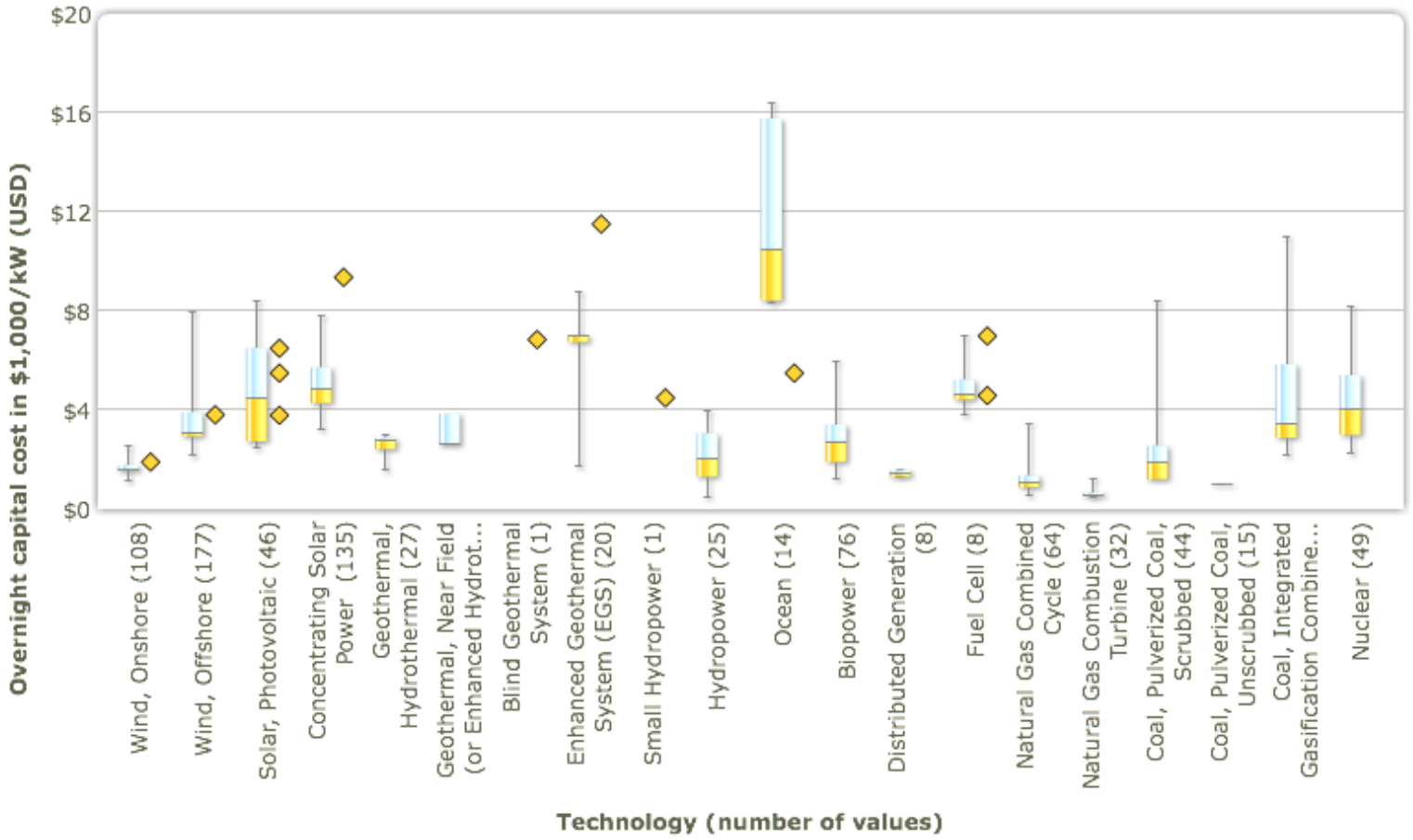
Vehicles

Submit a report
Download
Sources
Methods
More information

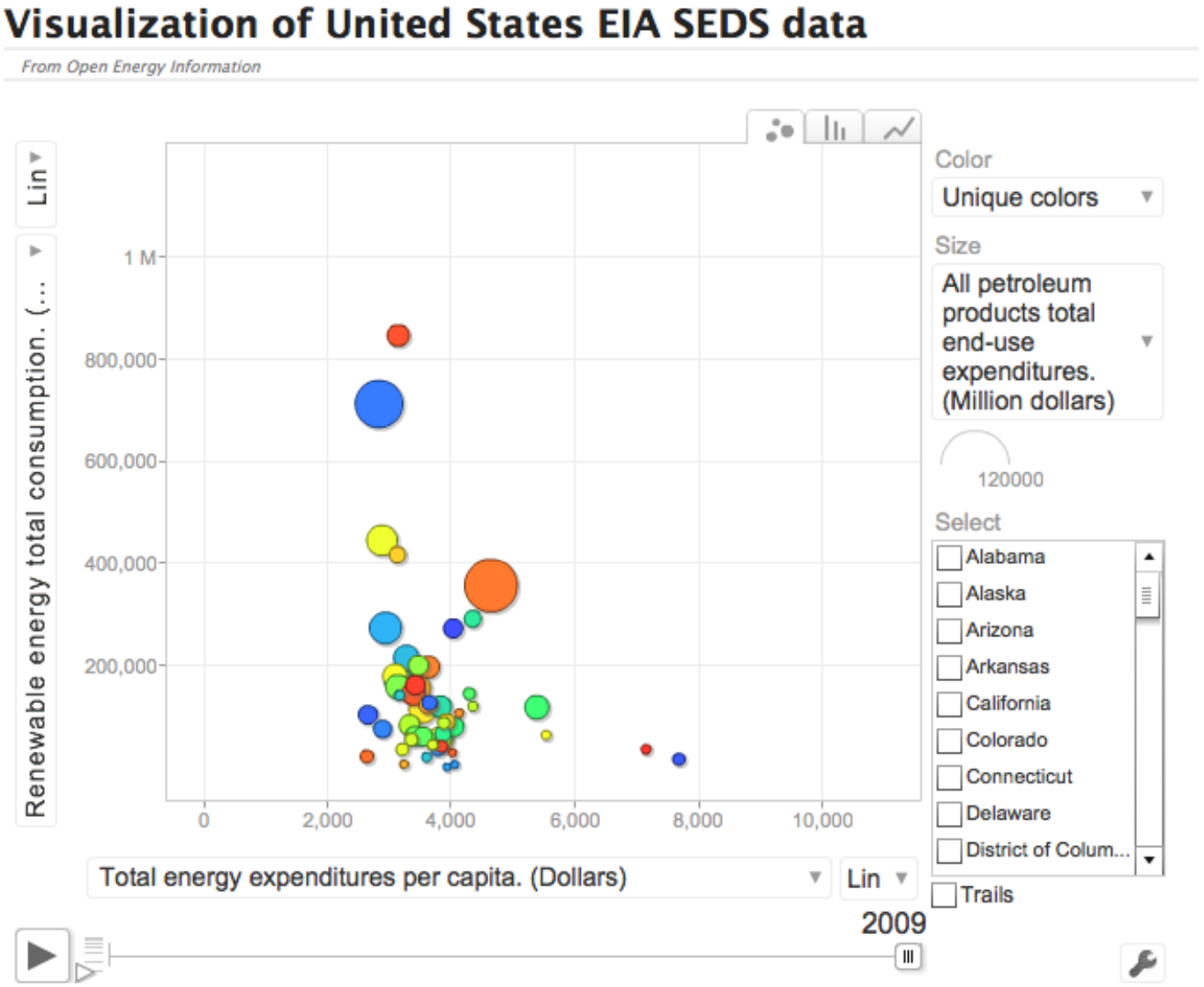
Overnight capital cost | Fixed operating cost | Variable operating cost | Capacity factor | LCOE

Box & whisker | Scatter

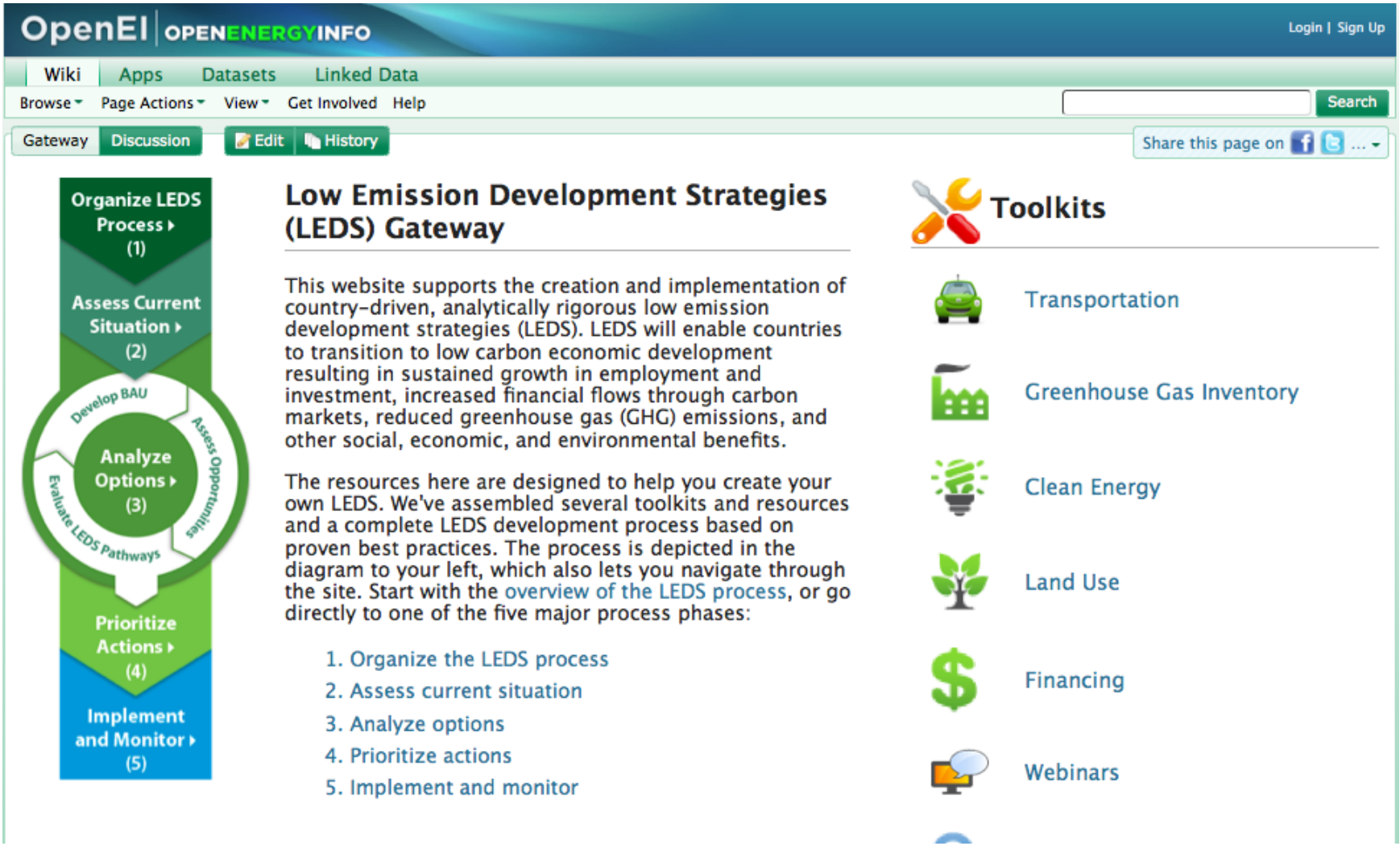
◆ Program Estimate
◆ Single value (insufficient data to show plot)



Time Series Data Visualizations



Low Emission Development Strategies (LEDS)



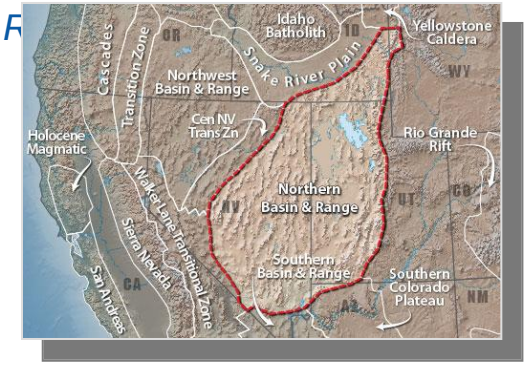
Geothermal Exploration Best Practices on OpenEI

Location

Power Plants/Projects → Geothermal Area → Geothermal Region

B… …elt Ho… …asin & R…

Photo Credit: http://www.pacificorp.com/es/re/blundell.html



Exploration Techniques

Category → Subcategory → Subcategory → Technique

Remote Sensing *Active Sensors* *Radar* InSAR

(can use any number of subcategories in OpenEI)

Activities

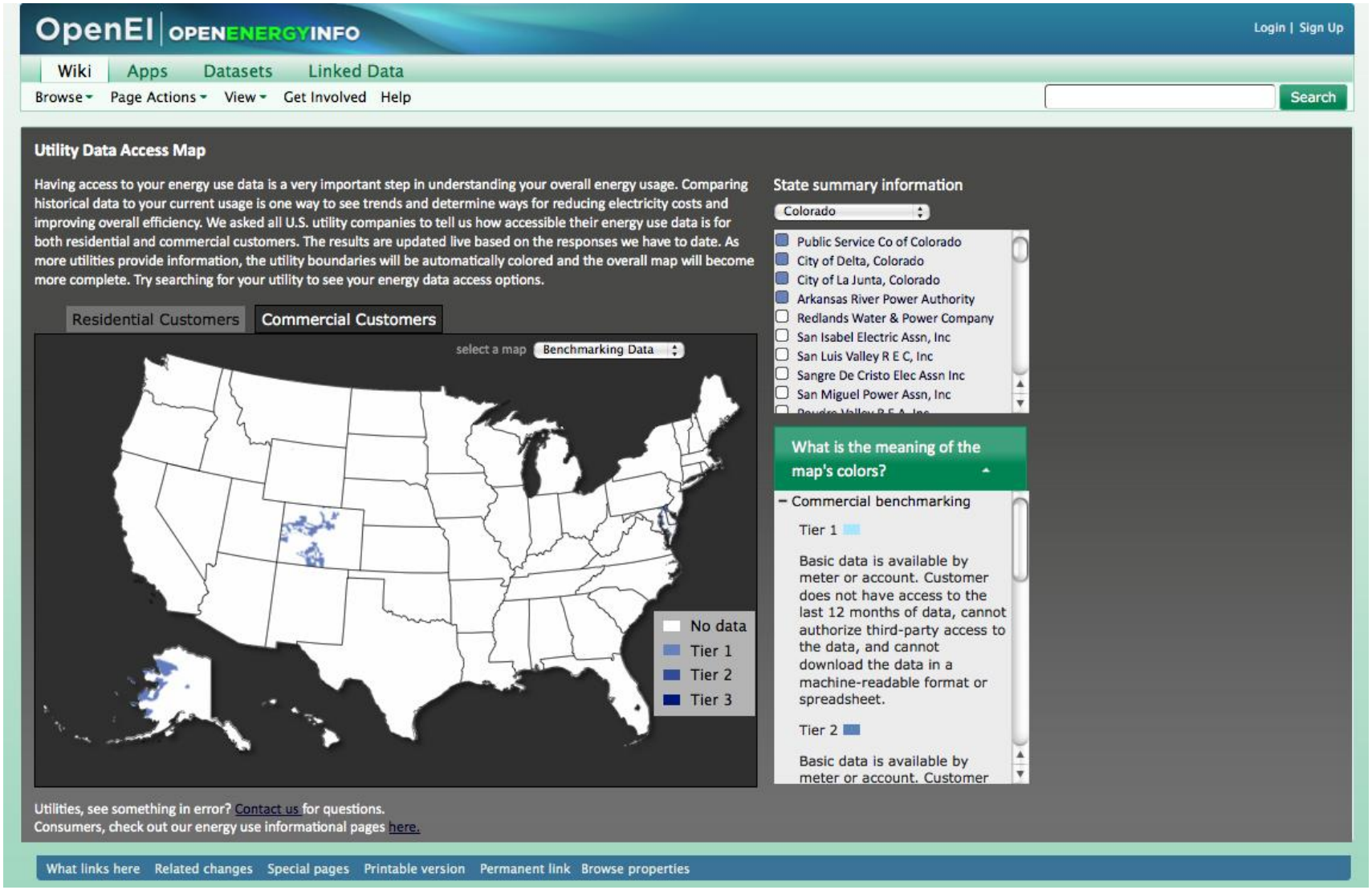
Source + Reference *(Kennedy & Van Soest, 2006)*

Geothermal Area + *Dixie Valley Area*

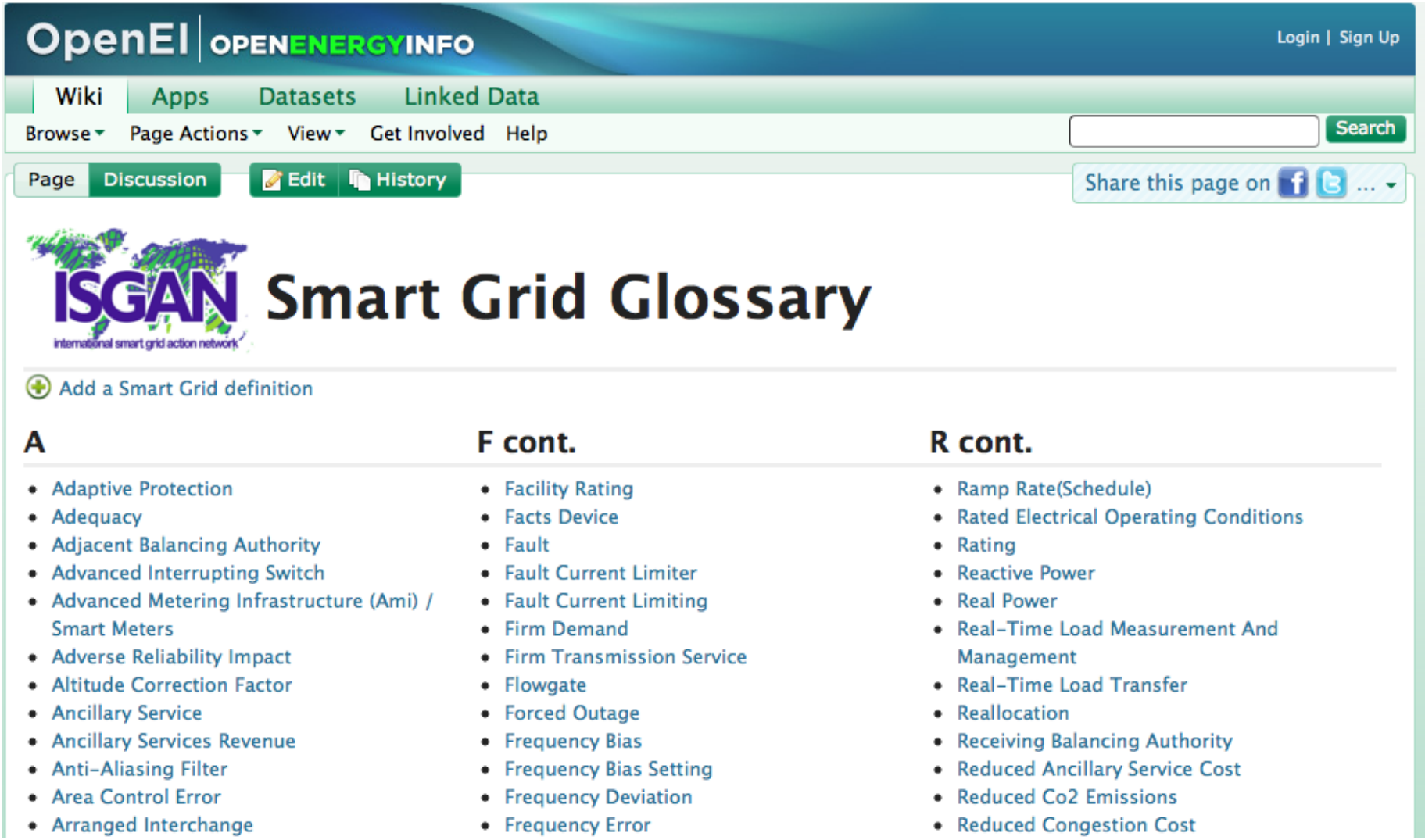
Exploration Technique *Water Sampling*

References

Utility Access Map – Ready to Launch 3/22



ISGAN Smart Grid Glossary



- ✓Transparent
- ✓Participatory
- ✓Collaborative